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ARTICLES IN CURRENT PERIODICALS.

BULLETIN DES SCIENCES MATHEMATIQUES, volume 45, November, 1921: "Sur la dynamique de la relativité" (conclusion) by G. Fontené, 320–339; "Discourse d'ouverture de la sixième conférence générale des poids et mesures, prononcé le 27 septembre 1921, au ministère des affaires étrangères, en présence de M. le Ministre du commerce" by E. Picard, 340–344 ["Messieurs, la science est une arme puissante, indifférente au mal comme au bien, on ne l'a que trop vu pendant quelques années. Notre vœu le plus cher, a nous tous qui sommes ici réunis, est que, rendue à ses fins bienfaisantes, elle ne cesse plus d'être cet outil de merveilleux service, dont parlait déjà notre vieux Montaigne, qui contribue à l'amélioration des conditions de la vie et fournit un des signes les moins contestables des progrès de l'humanité, tout en restant la grande parure dont l'idéal reflète la curiosité passionnée et désintéressée qui est l'honneur de l'esprit humain. Dans maintes recherches scientifiques, l'âge héroique est passé, où avec un matériel très simple on pouvait faire de grandes découvertes. Quoique tout reste possible aux hommes de génie qui, de loin en loin, ouvrent des voies nouvelles avec des moyens de fortune, le progrès scientifique résulte le plus souvent aujourd'hui de longs et patients efforts, qu'il s'agisse de laborieux calculs, ou de minutieuses observations et expériences. . . . Nous ne croyons plus guère au dogme de la simplicité des lois de la nature, qui enchantait nos prédécesseurs et qui a rendu tant de services aux sciences naissantes, tout en l'utilisant cependant encore de facon plus ou moins consciente. Nous accumulons approximations sur approximations, mais un des articles de nôtre foi scientifique est que ces approximations successives sont convergentes, comme disent les mathématiciens, et que nous approchons sans cesse d'un petit nombre de vérités toujours plus compréhensives, synthèses des nombreuses vérités partielles peu à peu découvertes. C'est peut-être une chimère, mais elle soutient des générations de chercheurs dans leur labeur jamais terminé."]—December, 1921: "La théorie de la relativité et ses applications à l'astronomie" by E. Picard, 355–372—Volume 46, January, 1922: "Sur les intégrales de Fresnel" by A. Bloch, 34–35; "A propos d'un nouvelle revue mathématique: *Fundamenta Mathematicæ*" by H. Lebesgue, 35–48 (see *1921*, 317).

[Quotation from last article: "En 1919, au milieu des événements que l'on connaît, il s'est trouvé à Varsovie, un petit groupe de mathématiciens assez hardis pour oser créer un périodique mathématique nouveau, *Fundamenta Mathematicæ*, et assez épris de leur science pour trouver le temps de travailler d'une façon si heureuse que les deux tomes, actuellement parus, des *Fundamenta* sont presque entièrement remplis par leurs seuls Mémoires.

"La rédaction s'exprime ainsi: 'Le journal *Fundamenta Mathematicæ* publie les Mémoires (ou Notes) consacrés à la Théorie des ensembles et les questions qui s'y rattachent. (Les applications immédiates de la théorie des ensembles, *Analysis situs*, la logique mathématique, les recherches axiomatiques.)'

"Cette délimitation sera très diversement appréciée. Elle sera approuvée par beaucoup de mathématiciens et de philosophes, s'intéressant presque exclusivement aux questions traitées dans les *Fundamenta*, et qui seraient très heureux de trouver réunis tous les articles qui s'y rapportent. Mais, s'il en était ainsi, ils n'auraient plus jamais cette bonne fortune de prendre un journal pour y lire un article, de parcourir un autre mémoire par désœuvrement et de trouver ainsi des sujets de travaux ou, ce qui est mieux, d'avoir une occasion de s'instruire. . . .

"Je souhaite vivement que la rédaction interprète son programme de la façon la plus large, que, dorénavant, chaque tome contienne plusieurs articles traitant aussi des 'vieilles' mathématiques afin que tout lecteur soit incité à s'instruire dans des directions variées. Il suffirait, pour cela, qu'on admette en principe tout article contenant une application *quelconque* de la théorie des ensembles, et non plus nécessairement une application *immédiate*, comme le demande le programme. . . .

"Cette petite réforme engagerait sans doute les Auteurs à écrire de façon à être compris de tous, ce dont il ne semble pas qu'ils se soient toujours beaucoup préoccupés. . . .

"Les notations utilisées ici, qui ne sont pas expliquées dans l'article, sont en relation avec celles introduites par Janiszewski dans sa Thèse et qui avaient vivement intéressé Poincaré. Je n'en puis faire un plus grand éloge; cependant, il ne faut pas oublier que tout le monde n'excelle pas, comme Poincaré, à manier tous les symboles et, pour ma part, je n'ai jamais pu réussir à calculer à l'aide des équations de Janiszewski qui ne sont donc, pour moi, qu'une notation qu'il me faut traduire. Comme, à l'époque de sa Thèse, je le disais à Janiszewski; ce jeune homme ne sut pas me cacher qu'il me considérait comme une vieille baderne. Il avait peut-être raison; toutefois, je crois qu'il faut s'efforcer d'être compris facilement, même par les vieilles badernes. Et, pour cela, éviter de multiplier les notations; en tout cas, ne jamais oublier de les expliquer. . . ."]

L'ENSEIGNEMENT MATHEMATIQUE, volume 22, nos. 1–2 (issued January, 1922): "Applications géométriques de la cristallographie" by M. Winants, 5–29 (to be continued); "Sur le rayon de courbure d'une courbe" by B. Niewenglowski, 30–37; "Sur les séries entières, dont la somme est une fonction algébrique" by G. Polya, 38–47; "Sur le nombre *e*" by M. Petrovitch, 48–50.

MATHEMATICAL GAZETTE, volume 11, January, 1922: "Solutions to missing-figure problems" by W. E. H. Berwick, 8–9 [see *1921*, 37–38, 278]; "Partial fractions associated with quadratic factors" by E. H. Neville, 10–13; "Relativity rhymes, with a mathematical commentary" partly by H. Piaggio, 22–23 ["A. *The Restricted Theory.*

"Einstein's is a wonderful notion
That a rod will contract when in motion,
All the clocks will go slow,
And yet no one will know!
So the matter need cause no commotion.

"B. *The General Theory, applied to Planetary Motion.*

"If the path of a planet you'd trace,
You've Christoffel's weird symbols to face,
For an orbit, you see,
Is as straight as can be
On a surface in quintuple space."

Additional verse, "*The German Jeweller's Complaint.*

"Einschtein hash a schandaloush notion
About how the universe gosh on.
He shaysh I sha'n't know
If my glocksh all go shlow
And my money'sh shrunk up by itsh motion."];

"A mathematical recreation" by G. A. Miller, 23–24 [About the area of a triangle. See *1921*, 256–258]; Review of F. Cajori's *History of the Conceptions of Limits and Fluxions in Great Britain from Newton to Woodhouse* by J. M. Child, 26–30.

MATHEMATICS TEACHER, volume 14, November, 1921: "Vectors for beginners" by J. B. Reynolds, 355–361; "A great mathematician as a school boy" by D. E. Smith and Vera Sanford, 362–366; "The formula in ninth grade algebra" by J. M. Kinney, 367–380; "Combined mathematics" by W. P. Webber, 381–386; "Teaching pupils how to study mathematics, II" by A. Davis, 387–400 (to be continued); News and notes, Round-table Discussion, and New books, 401-411—December: "Religio mathematici" by D. E. Smith, 413–426; "An elementary exposition of the theorem of Bernoulli with applications to statistics" by H. L. Rietz, 427–434; "The relative emphasis upon mechanical skill and applications of elementary mathematics" by F. Allen, 435–443; "Mathematics as found in society: with curriculum proposals" by P. M. Symonds, 444–450; "A note on the failure of educated persons to understand simple geometrical facts" by E. L. Thorndike, 451–453; "Teaching pupils how to study mathematics" (continued) by A. Davis, 454–468; News and notes, 469–473—Volume 15, January, 1922: "The human worth of rigorous thinking" by C. J. Keyser, 1–5; "The nature of algebraic abilities" by E. L. Thorndike, 6–15; "The next step in method" by W. H. Kilpatrick, 16–25; "The next step in content in junior high school mathematics" by D. E. Smith, 26–27; "The next step for the administrator in junior high school mathematics" by J. K. Van Denburg, 28–29; "Minimum mathematical requirements for agricultural study" by H. B. Roe, 30–42; "A composite course for seventh and eighth grade mathematics," 43–48 [A report by the Articulation Committee for Mathematics of the Lake Shore Division of the Illinois Teachers' Association]; "The teaching of mathematics: The need and the method" by F. B. Williams, 49–56; New books, 57–58; "The Chicago meeting of the National Council of Teachers of Mathematics," 59–61—February: "Experimental courses in secondary school mathematics" by R. Schorling, 63–78; "The nature of algebraic abilities" (continued) by E. L. Thorndike, 79–89; "The volume of a sphere," 90–92; "The psychology of errors in algebra" by P. M. Symonds, 93–104; "Prescribed versus elective mathematics in junior high schools" by D. Snedden, 105–109; "Certain cases of extraneous roots" by A. S. Hegeman, 110–118; "Arithmetic in the high school" by L. G. Dake, 119–125; "Program of the Chicago meeting of the National Council," 126.

MONIST, volume 31, October, 1921: "Relativity and its philosophic implications" by W. B.

Smith, 481–511 [An address delivered at the New Orleans meeting of the Southern Society of Psychology and Philosophy, April, 1920]; "Criticisms and Discussions: The principles of functional calculus" by M. Winter, 608–634 [Authorized translation, abridged, by F. Rothwell from *Revue de Métaphysique et de Morale*, volume 21, July, 1913, 462–510]; Reviews, 635–638: S. Brodetsky's *A First Course in Nomography* (by J. M. Child), C. E. Weatherburn's *Elementary Vector Analysis*, H. T. H. Piaggio's *Elementary Treatise on Differential Equations and Their Applications* (London, G. Bell & Sons); A. N. Whitehead's *Organization of Thought, Educational and Scientific* (London, Williams & Norgate).

NATURE, volume 108, December 1, 1921: "Currents of mathematical thought" by G. B. M(athews), 427–429 [Review of P. Boutroux, *L'Idéal Scientifique des Mathématiciens: Dans l'Antiquité et dans les Temps Modernes*]; "Relativity and materialism" by H. Elliot, 431; "The tendency of elongated bodies to set in the north and south direction" by E. A. Reeves, 433 [Mentioning experiments that indicate a much stronger force than the gravitation force certain other writers have described. See *1922*, 22,75]; "Relativity: Particles starting with the velocity of light" by E. Kasner, 434–435; "Reflection from cylindrical surfaces" by C. O. Bartrum, 436 [see *1922*, 75]—December 8: "Relativity and materialism" by H. W. Carr and E. McClure, 467; "The Rayleigh memorial," 471–474 [Account of the unveiling of a memorial tablet in Westminster Abbey, with the address by Sir J. J. Thomson]—December 22: "The tendency of elongated bodies to set in the east and west direction" by W. D. Lambert, 528—December 29: "Relativity and materialism" by H. Jeffreys, S. V. Ramamurty, and N. R. Campbell, 568–569; "Next year's total solar eclipse (September 21, 1922)" by W. J. S. Lockyer, 570–571—Volume 109, January 5, 1922: "Fermat's last theorem," 4 [Review by G. B. M(athews) of Mordell's *Three Lectures on Fermat's Last Theorem*]—January 12: Review by W. E. H. B. of M. Cashmore, *Fermat's Last Theorem*: *Proofs by Elementary Algebra*, 39 ["In view of the considerable erroneous literature concerning Fermat's last theorem it may not be out of place to direct attention to two valuable additions to the correct literature which have appeared since the last edition of Mr. Cashmore's book was reviewed in *Nature*. They are: (1) Mr. L. J. Mordell's 'Three Lectures on Fermat's Last Theorem,' and (2) a chapter in vol. 2 of Prof. L. E. Dickson's 'History of the Theory of Numbers.' "]; "Reform of the calendar: mean value of the year" by A. Rose-Innes, 44 ["If we say that 'a century-year shall be a leap-year only if it gives a remainder of 2 or 7 when divided by 9,' we have a rule which is much more approximate than the Gregorian rule, and one which has been followed *de facto* since 1582 (year of the Gregorian reform). The new rule would not differ in its application from the Gregorian rule before the year 2400. The Gregorian year, 365 97/400 days, differs from the true tropical year by 26 seconds; if the above modified rule were introduced the difference would be reduced to 2 seconds."]—January 19: "Congress of philosophy in Paris: Recent developments of relativity theory," 90.

LA NATURE, volume 49_2, October 29, 1921: "La Conférence générale des Poids et Mesures" by E. Picard, 276–278; "Utilisons la 'Houille Bleue'" by H. Lémonon, 278–283 (to be continued) [Description of some machines invented for using the energy of the sea]—November 5: "La conduite des navires à distance par T. S. F." by S. Jourdan, 292; "La lune est-elle un monde vivant?" by E. Touchet, 293–300 [Resumé of W. H. Pickering's theories as to the existence of mechanical and physical movements and of vegetation on the moon]—December 17: "L'eclipse de Soleil du 21 septembre 1922", supplement, 191; "Le plus gros télescope du monde," supplement, 191—Volume 50_1, January 7, 1922: "Einstein et les théories de la relativité" by A. Troller, 11–12; "La théorie de la relativité" by H. Lafond, 12–15 [The first of a series of articles to be published on this subject]—January 21: "Les bases fondamentales de la théorie de la relativité" by H. Lafond, 35–39—January 28: "Le principe de la relativité" by H. Lafond, 57–60—February 4: "La théorie de la relativité: Quelques résultats et quelques expériences" by H. Lafond, 73–78.

OBSERVATORY, volume 44, November, 1921: "The age of the earth" by Lord Rayleigh, J. W. Gregory, and A. S. Eddington, 325–329; "On the origin of comets" by C. D. Perrine, 329–331; "Elliptical halos" by A. Grace Cook, 334–335; "The interpretation of the experiment of Michelson and Morley," 340–341 [. . . "the eminent physicist, the late Prof. Righi, of Bologna, shortly before his death presented to the Royal Institute of Bologna a couple of memoirs purporting to prove that the generally accepted interpretation of Michelson and Morley's experiment is unsound," . . .]; "Repetition of Michelson-Morley experiment on ether drift," 341 ["In view of the importance of this historic experiment which was originally made in 1887, and repeated by Morley and Miller in 1904–5, the work is being repeated this year with all modern conveniences and refinements."]—December: "Meeting for the discussion of geophysical subjects," 366–368 [Discussion of the "Eötvös Gravity Balance"]; "The Einstein tower," 372–373 [with a photograph as frontispiece].

POPULAR ASTRONOMY, volume 29, December, 1921: "The glacial period and Drayson's hypothesis" by J. Millis, 608-625 [Accounting for the glacial periods in the earth's history by supposing that the equatorial axis has an eccentric motion about the axis of the ecliptic so that the angle between the two axes varies between $23\frac{1}{2}$ and $35\frac{1}{2}$ degrees in the course of a revolution of the former about the latter]; "Note concerning the total solar eclipse of next year," 665.

PROCEEDINGS OF THE EDINBURGH MATHEMATICAL SOCIETY, volume 39, session 1920–21, November, 1921: "Multiply perspective polygons inscribed in a plane cubic curve" by D. G. Taylor, 2–6; "An analytical treatment of the cam problem" by G. D. C. Stokes, 7–12; "Asymptotic expressions for the Bessel functions and the Fourier-Bessel expansions" by T. M. MacRobert, 13–20; "Some extensions of Pincherle's polynomials" by P. Humbert, 21–24; "Taylor's theorem and Bernoulli's theorem: A historical note" by G. A. Gibson, 25–33 ["It is, from our present standpoint, strange to see how near Newton in particular came to Taylor's Theorem and yet did not actually attain to it; the reason for this is not quite easy to understand but we should at least learn the lesson that it is not safe to credit a writer with the possession of recondite theorems unless on plain evidence. The tendency to read our own ideas into the work of previous writers is just as bad as the opposite tendency of crediting to ourselves what was the possession of our predecessors. Above all, the detestable vice of 'nationalism' in science must be studiously shunned; it would be hard to overstate the loss that British mathematics suffered from the baleful controversy on the invention of the Calculus."]; "The vibrations of a particle about a position of equilibrium" by B. B. Baker, 34–57; "On the relation between Pincherle's polynomials and the hypergeometric function" by B. B. Baker, 58–62; "Addition of a third of a period to the argument of the elliptic function" by D. G. Taylor, 63–67; "Mathematical notes," 69–79 [Note on page 74 is a communication from A. D. Russell referring to a proof of the law of tangents to which the editor of the MONTHLY had called his attention (*1920*, 53–54)].

REVUE GÉNÉRALE DES SCIENCES, volume 32, November 15, 1921: Review by J. Bosler of the French translation by J. Rossignol of Eddington's *Space, Time, and Gravitation* (*Espace, Temps, Gravitation*), 617–618 ["L'édition anglaise comportait en appendice quelques notes théoriques assez succinctes: un important complément inédit, écrit tout exprès par M. Eddington, permettra cette fois au lecteur géomètre d'approfondir une foule de points délicats que le corps de l'ouvrage laissait à dessein sans démonstration et de dominer ainsi tout le sujet. . . . Il n'y a pas, a-t-on dit jadis, de 'route royale' en géométrie; il n'y en a pas non plus, semble-t-il, pour pénétrer au coeur de la doctrine relativiste. L'ouvrage de M. Eddington constitue du moins, avec ses compléments, sur tous ces problèmes, un traité aussi clair et aussi complet que possible."]—December 30: "Les nébuleuses spirales sont-elles des galaxies?" by H. Grouiller, 726; "Sur la théorie d'Einstein et le mouvement du périhélie de Mercure" by J. Richard, 726–727 ["Le calcul pour parvenir à l'expression de ds^2 est long et pénible. Le facteur γ devant dt^2 s'explique par le fait qu'en l'adoptant on trouve la loi de Newton un peu modifiée. Mais ce qui parait moins naturel, c'est la présence de $1/\gamma$ devant dr^2. J'ai trouvé une explication sans longs calculs, qui n'est peut-être pas absolument satisfaisante, mais qui est simple. . . . Cette théorie me laisse profondément sceptique; elle prête à des objections énormes. Elle n'a de vrai, je crois, que les formules."]—Volume 33, January 15, 1922: "Y a-t-il une erreur dans le premier mémoire d'Einstein?" by E. Guillaume, 5-10—January 30: Review by M. Sauger of three books on relativity (Paris, 1921): L. Fabre, *Les Théories d'Einstein;* G. Moch, *La Relativité des phénomènes;* C. Nordmann, *Einstein et l'Univers*, 56–57.

REVUE DE MATHEMATIQUES SPECIALES, volume 32, December, 1921: "Sur une expression de la somme des puissances $p^{\text{ièmes}}$ des n premiers nombres entiers" by G. Beauvais, 49.

SCIENCE, new series, volume 54, December 9, 1921: "Lectures by Professor Lorentz at the California Institute of Technology," 572—December 23: "The National Academy of Sciences and the metric system" by C. D. Walcott, 628–629; "The order of nature" by R. D. Carmichael, 631–634 [Review of A. N. Whitehead, *The Principles of Natural Knowledge* (Cambridge University Press, 1919), of L. du Sablon, *L'Unité de la Science* (Paris, 1919), of L. J. Henderson, *The Order of Nature* (Harvard University Press, 1917), and of J. A. Thomson, *The System of Animate Nature* (London, 1920)].

SCIENTIA, volume 15, January 11, 1921: "Euclidean constructions" by Hilda P. Hudson, 346–354; "Critical note: l'oeuvre mathématique de Klein" by F. Enriques, 393–396 [About Klein, *Gesammelte mathematische Abhandlungen*, Bd. 1. Connects Klein's ideas of geometry and groups of transformations with the ideas of Einstein]; Review by G. Loria of Halsted's translation of Saccheri, 397–398 ["Par cette splendide publication, M. Halsted ajoute un nouveau mérite à ceux, déjà nombreux, qu'il s'est acquis en répandant la connaissance des écrits de celui à qui la géométrie noneuclidienne est redevable de son état actuel."]

Scientific American, volume 13, December, 1921: "Eliakim Hastings Moore," 137 ["Following the old rule that the office of President of the American Association for the Advancement of Science should pass from a representative of the natural sciences to one of the physical sciences, this year a prominent entomologist gives place to a distinguished mathematician. The high office of President of the Association is almost without exception conferred upon the foremost representative of some special branch of science in the United States and therefore Professor Moore's election at the Chicago meeting held last December at once indicates that in the opinion of his colleagues he ranks first among American mathematicians, a decision in which there can be no dissenting voice."]

Zeitschrift für mathematischen und naturwissenschaftlichen Unterricht, volume 52, nos. 9–10, published September 1, 1921: "Ein Schaubild zur Darstellung der Zeit-Raum-Verhältnisse in der speziellen Relativitätstheorie" by F. P. Liesegang, 193–201; "Zur Einführung des Integralbegriffes" by A. Harnack, 201–205; "Das Prinzip der vollständigen Induktion. Seine Geschichte und Anwendung im mathematischen Unterricht" by W. Lorey, 205–209; "Kleine Mitteilungen," 209–219; "Aufgabenrepertorium," 219–224; "Bücherbesprechungen," 235–245.

PROBLEMS AND SOLUTIONS.

Edited by B. F. Finkel, Otto Dunkel, and H. P. Manning.

Send all communications about Problems and Solutions to B. F. FINKEL, Springfield, Mo.

PROBLEMS FOR SOLUTION.

[N. B. Problems containing results believed to be new, or extensions of old results, are especially sought. The editorial work would be greatly facilitated if, on sending in problems, proposers would also enclose any solutions or information that will assist the editors in checking the statements. In general, problems in well-known text-books, or results found in readily accessible sources, will not be proposed as problems for solution in the Monthly. In so far as possible, however, the editors will be glad to assist the members of the Association with their difficulties in the solution of such problems.]

2959. Proposed by J. W. M. WEDDERBURN, Princeton University.

Solve the functional equation, $[g(x)]^2 = -2x + g(x^2)$.

2960. Proposed by E. P. LANE, University of Wisconsin.

When do two cones circumscribing a sphere intersect in two ellipses and when are the planes of the ellipses perpendicular?

2961. Proposed by J. L. RILEY, Stephenville, Texas.

Being given a triangle ABC, to determine two points P, P' such that the angles PBC, PCA, PAB are equal; also that the angles $P'CB$, $P'AC$, $P'BA$ are equal. Find also the equation of the circle which passes through the points P, P' and through the center of the circle circumscribing the triangle ABC.

2962. Proposed by R. M. MATHEWS, Wesleyan University.

To construct a triangle similar to a given triangle with its vertices lying on: (*a*) any three coplanar lines; (*b*) any three lines in space. (See Problem 2895, *1921*, 184.)

2963. Proposed by NATHAN ALTSHILLER-COURT, University of Oklahoma.

Through a given point to draw a line so that the sum of the squares constructed on the two segments cut off by it on the sides of a given angle should be equivalent to a given square.

2964. Proposed by N. P. PANDYA, Amreli (Kathiaward), India.

$ABCD$ is a quadrilateral circumscribed about a circle and an ellipse. AB touches the ellipse at P and the circle at Q. DC touches the same ellipse and the same circle at L and M, respectively. AD touches the ellipse at K. BC touches the circle at E. Find the condition that $PEMK$ may be a parallelogram.